Hecla
MINING COMPANY

October 28, 2003

Eric Johnson
United States Environmental Protection Agency
Region 8
999 18th Street, Suite 300
Denver, CO 80202-2466

RE: Responses to EPA October 6, 2003 technical comments on Apex site Pond 2 closure plan; USEPA ref. 8ENF-L, Docket No. RCRA-8-99-06

Dear Eric:

We have discussed your comments with the design engineer and offer the following responses:

1. Volume I, Section 2.2 Potential Borrow Source Materials Investigation, Page 7.

   What is the proposed reclamation plan for these source material borrow sites? **The Selected Alternative (Alternative 2 - GCL) will utilize only on-site soils (designated TP-1 soils) from the southeast, east, and northeast sides of Hecla=s property immediately adjacent to the impoundment. This one continuous borrow area is where the diversion channel for the impoundment will be located. After completion of excavation/ borrow activities it will be smooth graded to allow for uniform flow within the diversion.**

   Will the areas be graded to allow for adequate revegetation? **The estimated final configuration of the borrow area / diversion channel is shown in plan view (Figure 11) and in two cross-sections (Figure 12). This estimated final configuration is based on results (backhoe test pits) from the borrow source field investigation. The outside edges of the borrow area (this would be along the southern and eastern edges of Hecla's property limits) will be smooth graded with slopes typically ranging from approximately 3:1 (H:V) to 1:1 depending on suitability of the borrow material to be excavated and used for Protection Layer material. If very rocky or other unsuitable areas/materials are exposed during excavation, then that particular portion of the borrow area will most likely not be utilized. Slopes along the bottom of the diversion channel will also be smooth graded and will range from approximately 1 to 5%, again depending on suitability of the borrow material in the bottom for use as Protection Layer material.**

   What native plant species and mulch will be used to control surface erosion? **Based on our experience at a similar site, we believe that re-seeding will have very limited success at Apex. Very little precipitation falls at Apex, and surrounding vegetation is so sparse that unless the site receives an unusual amount of moisture the first season after re-seeding, there is likely to be very little, if any, establishment of at the site in a number of years. Native weeds will most likely be the predominate species to take hold with or without re-seeding, followed by shrubs identical to what surrounds the site. We do not believe that there will significant erosion in the borrow area/diversion channel due to (1) the very limited erosion that has occurred at the site in the past, without any revegetation efforts; (2) the hardness (or durability) of the**

materials that will be left exposed in the borrow area, and finally (3) the very limited drainage areas which we will be exposing or creating with our excavation activities.

At what rates will grass / mulch be applied? **Please refer to the previous comment.**

2. Volume I, Section 3.0 Closure Alternatives, page 8.

Have the proposed design alternatives incorporated earthquake standards to ensure long-term stability of Pond 2? **Yes**

If not, why was this not included? **The analysis was not include in the final report due to: (1) the very small size (height) of the embankment, (2) the limited potential for a spill and contamination if the embankment did fail, (3) the most likely very limited zone of spillage if the embankment did fail due to the nature of the wastes near the embankment, (4) the great distance to any inhabitants, and therefore (5) the minimal hazard associated with a very unlikely failure due to an earthquake.**

The calculated FOS from the pseudo-static stability analysis is 1.9 (static FOS was 4.1). This is a very high FOS for pseudo-static conditions. We utilized the USGS's suggested peak accelerations which were provided in the USEPA's design guidance document for municipal solid waste sites (EPA/600/R-95/051 - RCRA Subtitle D (258) - Seismic Design Guidance for Municipal Solid Waste Landfill Facilities). Both of these analyses were conducted for the reclaimed condition, i.e., >100 years.

3. Volume I, Section 3.2.3 Alternative 2 (GCL) - Selected Alternative Cover System, page 12.

How can Hecla better stabilize the embankment side slopes if bentonite becomes hydrated? **The simplest plan would be to add buttressing material if any movement on the slopes was noticed / measured. However, based on our review of the EPA's data for GCL=s (EPA/600/R-96/149 - Report of 1995 Workshop on GCL's) we will not have any significant movement, and no failures of the GCL, even if the bentonite within the GCL becomes hydrated. According to that EPA document, needle-punched GCLs, such as Bentomat ST, which was specified for Apex, constructed on a 2:1 slope that was over 20 feet long, with bentonite moisture contents ranging from 100 to 250% moved only between 0 and 1.5 inches over a 250 day period. No significant movement or failures occurred within any of the needle-punched materials, even at very high bentonite moisture contents. Note that our proposed final slope will be 3.5:1, therefore the potential forces that could cause instability would be much less.**

Why isn't there any surface layer protection on the top cover areas (the outslopes will have a 2-inch thick layer of 1-inch rock)? **No erosion protection (rock) is required on the top surface (1% slope) of the impoundment as surface water runoff from the design storm will have very low flow velocities and shallow depths (based on analyses provided in Appendix F - Runoff Evaluation and Erosion Protection Sizing Analysis).**

Runoff analyses were based on a 6-hr, 25-yr storm (1.9 inches of rain in a 6-hr period). Calculated peak flow from this storm off the top of the impoundment was 0.28 cfs from a 50' wide strip. Prior to calculating rock sizes, this peak flow value was conservatively increased to 1.0 cfs based on concentration factors. Even with these increases no rock was required on the impoundment top surface.

The impoundment outslopes, however, are steeper (3.5:1), and analyses based on calculated peak runoffs and this steeper slope indicate that a D_{50} rock size of at least 3/4" will be required to ensure a factor of safety greater than 1 (no erosion).

The calculated peak flow depth and velocity for the impoundment top were 0.04 feet and 0.5 feet/second, respectively, and were 0.02 feet and 1.2 feet/second, respectively for the impoundment outslopes. Note also that in the Reclamation Plan the specified D_{50} of the outslope erosion protection material was conservatively increased from 3/4" (Appendix F design value) to 1.0".

4. Volume I, Section 4.2.4 Drainage and Consolidation, page 17.

How will Hecla determine that overall settlement has slowed to an acceptable rate? **Acceptable settlement rate guidelines will be based on the radius of the subsidence / settlement area and the total amount of settlement which has been measured at and around any given monument location. These guidelines were taken from Daniel 1995 and are shown in the table below. Maximum differential settlement values are the maximum subsidence that a GCL can withstand without damage (i.e., increasing the permeability of the GCL).**

Guidelines for Allowable Differential Settlement (GCL=s)	
Radius of subsidence area (ft)	**Maximum Differential Settlement (in each subsidence area) (ft)**
1	0.2
2	0.4
5	1.0
10	2.0
25	5.0

Note that the main reason to attempt to determine acceptable settlement rates prior to placing the Barrier and Protection Layers is to allow for as much differential settlement to occur prior to placement of the final two layers. Settlement prior to placement of the final two layers will occur due to a combination of drainage (wick drains) and pre-loading (regrading of embankments and top surface).

Settlement that occurs at (and near) each settlement monument will be graphed (time vs. total settlement). Once data from each graph indicates that settlement rates (or total settlement) have slowed to a point where damaging differential settlement will most likely not occur within the GCL, for a given subsidence area, as shown in the table above, then construction of the Barrier and Protection Layers can begin. The additional loading from the final two layers of the cover system will most likely cause some additional settlement, however, Hecla believes that this settlement will be minor and fairly uniform as additional loading from these two layers will be uniform over the impoundment surface.

What is the rate at which additional settlement will not compromise the long-term integrity of the overall cover system? **Please see the table above. It is not a rate, but more accurately a total amount for a given subsidence area.**

5. Volume I, Section 4.2.6 Collection Ditch and Evaporation Pond Removal and Disposal, page 18.

   If lined evaporation ponds are re-constructed to contain additional leachate seepage, a protective netting/barrier should be used over the ponds to prevent migratory birds and/or other wildlife from being exposed to the leachate. **The lined collection/evaporation ponds currently in place will be removed during the final closure of Pond 2.**

6. Volume I, Section 4.4.3 Surface Layer Placement, page 20.

   A surface layer consisting of at least 2-inches of 1-inch rock should also be incorporated on the top surface for superior long-term erosion protection from wind and/or rainfall (see comment re: Section 4.4.4). **The relatively large grain size distribution of soils (TP-1) used for the Protection Layer will minimize erosion due to wind at site. Any detrimental erosion (due to wind or surface water runoff) will be noted during future site inspections and managed / repaired accordingly, with addition of material if needed. I**

7. Volume I, Section 4.4.4 Diversion Channel Erosion Protection Placement, page 21.

   A 24-hour, 100-year storm event should be calculated to design runoff and erosion protection of the diversion channel (final cover system). If greater peak flow results from using the 24-hour, 100-year storm event vs. the proposed 6-hr, 25-year design, then this figure should be used to ensure greater stability and erosion control. **Greater peak flows are calculated utilizing the 6-hr, 25-year event. The 24-hr, 100-year event produces a peak flow of 0.12 cfs and 13.1 cfs for the 50' wide strip off the impoundment and at Junction 3 (the diversion channel outlet), respectively. The 6-hr, 25-yr event produces a peak flow of 0.28 cfs (off the 50' wide strip) and 26.6 cfs (at Junction 3).**

8. Volume I, Appendix C - HELP Modeling Results, Table 1 and Table 2.

   The surface cover system in Table 1 identifies a 6-inch layer of rock on outslopes only for all alternatives, and Table 2 identifies an 8-inch surface layer. However the text in Section 4.4.3, page 20 and table 3 - Final Closure Plan Alternatives, page 27, identifies the use of 2-inches of 1-inch rock.

   Why didn't the HELP Model calculations use the proposed rock thickness of 2-inches? **The HELP analyses were conducted prior to the erosion protection analyses, before it was determined that rock was not required on the impoundment top surface. Rerun of HELP model with 2-inches of rock on the outslopes only (none on top) shows the following result: 1) slightly more runoff annually (+0.247 inches), 2) slightly more annual evapotranspiration (+0.147 inches), 3) slightly less annual lateral drainage and percolation through the GCL. A hard copy of the HELP modeling results will be forwarded to you at your request. It appears without rock the cover system gets rid of water better (i.e., rock helps hold moisture in the soil).**

   A higher rate of runoff (inches/year) would occur with a 2-inch layer of rock on outslopes vs. a 6 or 8 inch layer of rock. **Nominally. However this only amounts to tenths of an inch per year.**

9. Volume I, Appendix F - Runoff Evaluation and Erosion Protection Sizing Analysis (Figures, Data and Calculations).

   Runoff calculations should use "poor conditions" due to the recent fire that eliminated the vegetative cover within the area contributing storm water runoff to the diversion channel. A more conservative figure (i.e., 86) should be used for the Soil Conservation Service curve number. It could be many years until ground cover is re-established asa brush, neither sparse or dense. **The change in value from 83 to 86 will increase peak flows from 10 - 15 % in the diversion channel. We are rerunning the analysis / rock sizing calculation to see if we need to increase the rock size. Based on our engineer's initial review of the rock sizing calculations, we could have a 12%**

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increase in flow and still stay with 3" rock for protection along the impoundment outslope within the diversion channel. The results will be forwarded to you when we receive them.

10. Volume I, Appendix H – Long Term Monitoring and Maintenance Plan.

Hecla proposes to inspect the cover, after construction, once a year. The inspection would be done by either Hecla or the engineer of record in early spring. Repair work deemed necessary would be completed no later than the fall. Based on Hecla's experience reclaiming tailing ponds and heap leach pads we propose a three year monitoring and maintenance period.

11. Volume II, Section 1.5.6 Work Progress Schedule, page 9.

Hecla will furnish EPA copies of the monthly construction progress reports.

12. Volume II, Section 2.3.6 Field Quality Assurance, page 19.

The engineer of record will review the CQA reports, and make the final inspection after the as-builts have been compiled, and provide the certification that the work has been completed to all specifications. The written certification, along with a copy of the as-built drawings, will be furnished to EPA within 30 days after the final inspection.

We are compiling an order of magnitude estimate for complete waste removal and will forward it to you in the near term. With regards to the potential borrow sources, note that the proposed design uses borrow from within the eight acres under lease by Hecla. To the best of Hecla's knowledge no tribal artifacts nor areas of cultural significance exist with in the eight acres.

If you have any additional questions or need clarification of the above responses please call me at (208) 769-4135 or e-mail at cgypton@hecla-mining.com.

Sincerely,

Chris Gypton
Project Manager – Senior Engineer

Cc: John Galbavy, esq.
Paul Glader – HMC Environmental Services